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ABSTRACT

Many colleges and universities are undergoing cultural changes as a result of extensive voice, data, and video networking. Local area networks link large portions of most campuses, and national networks have evolved from specialized services for researchers in computer-related disciplines to general utilities on many campuses. Campuswide systems bring together information on academic and administrative records, library data bases, calendars of events, job postings, and weather reports. The implications for higher education are enormous in the following areas: (1) instruction, where the impact is seen in advances in open classrooms, customized personalized learning, distance education, and intercollegiate collaboration; (2) library operations, which are affected by increasing percentages of library holdings in digital form and capacity for all the resources of the library to be brought together technologically; (3) distributed, networked administrative resources, from executive information systems to electronic transcripts and student charge-account systems; and (4) improved relations with both the external and internal community. The ubiquity of desktop computers and the proliferation of networks and useful networked information has changed not only the characters of institutions, but also the expectations of students, faculty, and staff. The single most important factor for the success of a networked campus environment is a consensus vision that is meaningful to the entire college community. (ECC)

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WHAT PRESIDENTS NEED TO KNOW ABOUT THE IMPACT OF NETWORKING

from the Higher Education Information Resources Alliance

Since ubiquitous voice, data, and video networking appeared on the Drake University campus in 1987, the new mechanisms for communication have triggered a change in the daily rhythm of that university. Electronic-mail and voice-mail systems allow faculty and staff to receive messages at all hours of the day and night, in the office, at home, or on the road—messages to which they can respond at their convenience. A campuswide video distribution system creates a similar store-and-forward environment for the video world. The president encourages incoming freshmen to use his e-mail address and maintains many of his widespread contacts with other members of the campus community by e-mail with capability for attaching word processing documents, spreadsheets, and other files.

Drake is one of many colleges and universities that are undergoing cultural changes as a result of extensive electronic connections. Within the last decade, computers that once operated in isolation have taken on new power and popularity as networked devices. Local area networks link large portions of most campuses, and national networks have evolved from specialized services for researchers in computer-related disciplines to general utilities on many campuses.

In a networked environment, users have access to a range of resources that was almost unimaginable even five years ago. Campuswide systems bring together information from all over the campus and its neighboring communities—academic and administrative records, library data bases, calendars of events, job postings, and weather reports—and increasingly support access to external sources of information through the Internet and BITNET. The ramifications for higher education are enormous—in instruction, in library operations, in administration, and in community service.

Impact of Networks on Instruction

The core mission of colleges and universities is learning. Networked information technologies, from simple e-mail to sophisticated linked multimedia classrooms, have the potential to foster a student-centered learning environment in which students can customize the learning process to their needs and faculty can work more like coaches than lecturers.

Open Classrooms. Computer conferencing and electronic mail allow students to communicate with instructors and with each other around the clock, allowing a new freedom of discussion, questioning, and clarification even in large classes. With networked communication, the classroom is always open.

Customized Personalized Learning. Interactive multimedia instructional software allows students to replay learning segments and explore new subjects at a depth appropriate to their own needs. New networked technologies also serve the specialized physical needs of students and faculty with disabilities. In the face of growing demands for remedial help, instructional software can ease pressures on staff by offering self-paced, self-directed resources. The use of live databases and real-time simulation and gaming brings a new level of immediacy and relevance to the learning process.

Distance Education. Communication with a growing population of distant or homebound learners and faculty can be maintained through a variety of formats, including voice, data, video, and integrated media. By combining elements of personal computers, digital television, and electronic libraries through multimedia servers and network-based delivery systems, colleges and universities can loosen the rigidity of the class schedule, relieving space pressures and accommodating complex schedules of the nontraditional student.

Collaboration. Colleges and universities can leverage resources by collaborating. At the University of Guelph, for example, an interactive audiovisual link connects classrooms to the University of Waterloo for joint graduate programs in chemistry and physics and will soon be expanded to include McMaster University.

Libraries as Networked Resources

Networking has created an emphasis on access to information rather than acquisition of it. Although the college library is still the most significant campus repository of information, its resources will increasingly be viewed as a network resource. Larger percentages of library holdings are available in digital form, from secondary bibliographic resources to the texts themselves.

The library of the future can be conceptualized as a collection of virtual libraries through which the resources of many libraries, information services, and knowledge stores are brought together technologically. Such a library can be tailored for the specific needs of each academic department or even individual faculty members through a variety of networks and workstation environments.

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Developing network access to this complex world of information requires the combined skills of faculty, research librarians, and information technology administrators to manage its electronic collection, structuring, representation, and dissemination. As a result, the library is becoming a major force in setting campuswide strategies for networked resources.

Distributed, Networked Administrative Resources

The computing and information environment of the future is distributed. Information resources will be located where they are most logically created or maintained, and users will access most information from their workstations. This means that institutional data can be keyed once and maintained by a data owner but accessed by any member of the campus community with the need and authorization.

Campuswide networks support a growing array of administrative and business applications, from executive information systems to electronic forms and transcripts. Student charge-account systems can track telephone and photocopy charges, purchases from soft-drink machines, and costs of custom-published books from the electronic library. The network can replace the mailing of physical stacks of paper while decreasing the time for distribution to virtually nothing, guaranteeing delivery at rates approaching 100 percent, and reducing costs drastically.

The result of a good network design is efficiency, reliability, timeliness, and ease of access. The prerequisite is strong centralized management—uniform technical standards, security precautions, ongoing funding, and continual user training and support.

Impact on Both Internal and External Community

Perhaps the greatest impact that networks have had on colleges and universities has been in interpersonal communications. Networks allow users to communicate inexpensively, unconstrained by time or distance. On campus, geographical and cultural barriers between units are being broken down by the ease and cultural neutrality afforded by networked communication. Networks have a particular impact on the sense of community, especially at large, dispersed institutions. A campus provost for the 57,000-student St. Petersburg Junior College observes that "The computer has pulled us all closer together. There is more of a community feeling now."

Networks are allowing colleges and universities to offer significant services to their communities as relatively painless extensions of their services to campus constituencies. Case Western Reserve University is pioneering information service to its broader community through Cleveland Free-Net. The seven year-old network offers over 300 information services to 40,000 registered users at a cost to CWRU of less than $200,000. Many colleges and universities offer network resources and support to local K-12 school systems, collaborative professional training by distance education, and shared library databases—thus projecting the image they want of a high tech, contributing neighbor.

Rising Expectations and New Issues

The ubiquity of desktop computers and the proliferation of networks and useful networked information has changed not only the character of institutions, but also the expectations of students, faculty, and staff. Users are no longer content with slow file transfer rates. Librarians and computing center personnel are swamped with demands for help accessing the wealth of information available on campus and worldwide networks. Installing, maintaining, and supporting networks have become a larger part of support staff workload.

As more users come on-line, system administrators must deal with knotty issues of security and access, information indexing and retrieval, filtering useful information, selecting hardware and software standards, and determining sources of funding. Not the least of the administrator's problems is the decentralized nature of higher education communities. With extensive networking, all units lose some of their autonomy because everything connects to everything else. Record keeping and information retrieval must conform to public needs, and previously independent units find themselves linked in unexpected ways. Also, while computer centers have been the organizational home of data and communications services, the advance of networks including voice and video communications, telemetry, and other decentralized computing facilities will probably require major administrative reorganization in most institutions.

However, the single most important factor for the success of a networked campus environment is a consensus vision that is meaningful to the faculty, staff, and students. This vision provides direction and substance to the endeavor—and it must be maintained by a highly placed champion with recognized authority.

At a time when higher education executives are being pressed to reduce administrative costs, networks are providing additional capabilities and efficiencies. Investment in networked information resources can improve the productivity of faculty, staff, and students, and the quality of instruction, research, and administration. It can position the institution to thrive in the decades ahead. While there is no way to predict where the evolution of information technology will lead higher education, change is certain to be extensive, expensive, and inevitable.

This piece is abstracted from the HEIRAlliance Executive Strategies Report #3. The Executive Strategies reports are published by the Higher Education Information Resources Alliance, a vehicle for cooperative projects among the Association of Research Libraries, CAUSE, and EDUCOM. For more information about this series of reports on critical issues in information technology for campus executives, contact editor Karen McBride at CAUSE, 4840 Pearl East Circle, Suite 302E, Boulder, Colorado 80301; (303) 449-4430, kmcbride@CAUSE.colorado.edu.

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